



STATE OF TEXAS

REPORT OF EXAMINATION OF HART INFORMATION SERVICES' eSLATE VOTING SYSTEM

PRELIMINARY STATEMENT

On May 16, 2000, Hart Information Services, Inc. (the "Vendor") presented its eSlate voting system for examination and certification. The examination was conducted in Austin, Texas. Pursuant to Sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

1. Mr. Nick Osborn, an expert in electronic data communication systems;
2. Mr. Tom Watson, an expert in electronic data communication systems;
3. Mr. Barney Knight, an expert in election law and procedure; and
4. Ms. Terry Vickers, an expert in electronic data communication systems.

Pursuant to Section 122.035(a), the Texas Attorney General appointed Dr. Michael Shamos, an expert in electronic data communication systems.

After the Vendor presented its system, the examiners examined it and cast ballots. Examiner reports on the system are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF THE eSLATE VOTING SYSTEM

The eSLATE voting system is a DRE ("Direct Recording Electronic") for elections consisting of three subsystems: the Ballot Origination Software System ("BOSS"), the Precinct Voting System ("PVS"), and the Tally System ("TS").

The BOSS version 2.0 is used to set up the ballot and produce flash cards called Mobile Ballot Boxes ("MBB") version 1.08 to initialize each precinct. The MBBs are then loaded into Judges Booth Controllers ("JBC") version 1.08 at the precinct level by the presiding judge. BOSS was presented at the examination.

The PVS consists of a JBC, a standalone device powered by an uninterruptible power supply and connected to a printer for producing precinct total reports. The JBC is networked by cable to up to 12 Electronic Voting Units ("EVU") version 1.08, which are touch screen DRE machines designed for voting at the precinct level. Once the voter has cast his or her ballot, the votes are recorded onto both the JBC and the MBB. The EVU is disabled until re-activated for the next voter. After the polls close, the JBC can either print out totals or transfer results by modem to the central counting station. If the modem option is used, the vote totals must be printed from the JBC before the modem transfer is initiated for verification purposes.

The TS version 2.1 is a PC into which precinct results are compiled for an election, either directly by loading the MBB from the various precincts or by receiving results by modem from JBC at the precinct level. The TS accumulates the totals and prints reports.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of our voting system examiners as set out in their written reports.

The eSLATE system meets the standards for certification as prescribed by Section 122.001 of the Texas Election Code. Specifically, the system:

1. Preserves the secrecy of the ballot;
2. Is suitable for the purpose for which it is intended;
3. Operates safely, efficiently, and accurately;
4. Is safe from fraudulent or unauthorized manipulation;
5. Permits voting on all offices and measures to be voted on at the election;
6. Prevents counting votes on offices and measures on which the voter is not entitled to vote;
7. Prevents counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevent counting votes for more than the number of candidates for whom the voter is entitled to vote;
8. Prevents counting a vote on the same office or measure more than once;
9. Permits write-in voting;
10. Is capable of permitting straight-party voting; and
11. Is capable of providing records from which the operation of the system may be audited.

INDEPENDENT TESTING AGENCY APPROVAL

The Secretary of State has received confirmation of the approval of the eSLATE Voting System (firmware version 1.08, BOSS version 2.0, and Tally System version 2.1) by Wyle Laboratories, an independent testing authority, reference no. Wyle J/N 42062, purchase order no. 0098-0083.

CONCLUSION

The examiners recommended certification, subject to the Secretary's determination that the Vendor address the issues raised in their reports. The Vendor presented modifications to its system for review in Austin on August 21, 2000. The changes adequately addressed the zero total report, private (protective) counter, and audit log content concerns set out in the examiners' reports. Accordingly, I hereby certify the eSlate voting system for use in elections in Texas.

Certified under my hand and seal of office, this 13th day of September, 2000.


ELTON BOMER
SECRETARY OF STATE

Information Services Division
P.O. Box 12887
Austin, Texas 78711-2887



Elton Bomer
Secretary of State

Office of the Secretary of State

TO: Ann McGeehan
Elections Division Director

FROM: Terry Vickers
Voting System Examiner, Elections ASM

DATE: June 13, 2000

RE: Hart Election Services, Inc. d/b/a/ Worldwide Election Systems submitted a new DRE voting system (yet to be named) for certification

A voting system certification examination was held at the Office of the Secretary of State Elections Division on Wednesday, May 16, 2000. Hart Election Services, Inc. d/b/a/ Worldwide Election Systems submitted their new DRE voting system Ballot Origination Software System (BOSS), TALLY v1.1 software for the Precinct Voting System (PVS) for certification in Texas.

All comments and recommendations made in my capacity as an examiner of voting systems are based on documentation and demonstrations provided by the voting system vendor. These comments are not intended for use as specific recommendations on product development.

The Precinct Voting System (PVS) is a Direct Recording Electronic (DRE) voting system designed to manage, conduct, and report on elections. The Precinct Voting System is used for the precinct polling places and early voting sites.

The Precinct Voting System is distributed from a central location to geographical precincts or early voting sites. The central location, or headquarters, corresponds to the main offices of the jurisdiction. The precincts are election districts divided geographically according to population and jurisdictional boundaries. Early voting sites are selected geographical locations within a jurisdiction that support the complete election and allow voters from any precinct to cast their vote.

The networked Precinct Voting System is made up of a controller, called the Judges Booth Controller, and multiple voter input devices, called the EPC.

The four major components of the Precinct Voting System include:

1. Judges Booth Controller (JBC) v1.04.03 - The JBC is a stand-alone device located at each precinct-polling place that controls from one to twelve EPC's.

2. EPC - The EPC is used for voting, presenting the ballot to the voting public and accepting their selections. The EPC has the following additional feature in a recessed cavity in the back for installation of an optional Disabled Access Unit (DAU).

3. Disabled Access Unit (DAU) - The DAU is an optional device that can be included in the EPC and uses a slot to insert a FLASH memory card containing audio data.

4. Mobile Ballot Box (Mobile Ballot Box) - A reusable, portable FLASH memory device, the Mobile Ballot Box is used for storing and transporting election information to and from the polling places. FLASH memory does not require batteries to maintain the data written to it. The Electronic Ballot Data contains; All possible ballot styles for the jurisdiction, A list of polling places and allowable ballot styles for each, Ballot format information for display on the EPC, A list of serial numbers, both public and private for allowable EPCs and JBCs, and Passwords

The Ballot Origination Software System (BOSS) v1.21 product is for the county-level election office that defines and produces its own ballots. BOSS is expected to be used in conjunction with other products in the Worldwide Election Systems product line, such as the Judge's Booth Controller (JBC), Electronic Punch Card (EPC), and Tally software. The primary function will be to generate ballot definition information that can be used in these other products.

The following describes the minimum hardware and software needed for BOSS CLIENT AND SERVER MACHINE:

- Single processor, Pentium (300 MHz clock speed or better)
- 64 MB RAM, with at least 256MB/512MB swap files
- (1) 10 GB Hard disk
- CDROM and Floppy Drive
- Parallel interface
- 12/24 GB DAT Tape Drive or CD/RW drive
- Monitor - Screen Resolution set to 1024 x 768 pixels.
- Microsoft NT 4.0 Server (Service Pack 5)
- (1) Uninterruptible power supply (UPS) sufficient to power the BOSS machine for five minutes
- Sybase SQL Anywhere 5.5.04 - included in the BOSS install program

The Tally System v1.1 is used to tabulate votes from ballot images gathered from various ballot formats supported by Worldwide Election Systems (WES) products. The Tally system will read in the ballot images, verify their authenticity, tabulate the results of each contest, and report on those results.

Recommendation: The PVS/EPC has a public counter only and does not track all votes cast on that particular unit for an election. Only the JBC maintains a private counter to track all votes for an election. If an EPC becomes defective during an election, a reconciliation process with the JBC private count with public counter on the EPC should be implemented.

A side note, the JBC had no way to audit the number of Spanish ballots used, which could be an issue for challenge.

I recommend certification.

HART – Worldwide Election Systems

Worldwide Elections Systems demonstrated their voting system in Austin on May 16, 2000. This was the first time the system had been examined.

The system is comprised of 3 main subsystems.

BOSS

The Ballot Origination Software System, BOSS, is used to define an election. It runs on a standard PC using the NT operation system and the Sybase SQLAnywhere database. It is used to setup the candidates, races, propositions, precincts, etc. and then produce an election setup that is used to control the voting machines and the central-count tabulation.

The BOSS system is easy to use. When the setup has been proofed, the election setup is downloaded to PCMCIA cards know as EBB's, Electronic Ballot Box. The setup is stored on the EBB in a proprietary format and cannot be easily altered. All EBB's contain the entire election setup and therefore can be used in any precinct, including Early-Voting locations. After all the EBB's are created the database is locked using the "Lock Election for Tally" command. This prevents modification of the database for any reason.

A database error occurred when the demonstrated try to assign an alias to a write-in candidate. The vendor acknowledged that this was a bug.

PVS

The Precinct Voting System, PVS is a DRE voting system comprised of a Judges Booth Controller, JBC, and 1 to 12 Electronic Voting Units, EVU's. The JBC (Version 1.0.4.03) has an integrated thermal printer and modem. The EVU's are daisy-chained together and connected to the JBC via a 485 serial cable.

An EBB card controls the JBC. It does not have any stored medium other than the EBB and its flash memory. Once the EBB has been inserted into the JBC and a password is entered to begin initializing the PVS, the EBB is stamped with a unique identifier that prevents it from being used elsewhere. A checksum stamped into the EBB when the election setup was downloaded from BOSS is used to validate that setup has not been modified.

The voting process is as follows:

- 1) A voter signs the signature roster and is validated to vote in the precinct.
- 2) The election worker enters the precinct id into the JBC to assign the

correct ballot style for the user. A 4-digit voter code is printed and given to the voter.

- 3) The voter goes to any of the EVU's and enters the code. Once the code is accepted it can no longer be used. If the voter chooses not to vote the JBC operator can make the code invalid. Also the voter code is automatically invalidated after a set period of time.
- 4) The voter selects their preferred language, makes their selections and casts the ballot. The EVU presents the ballot clearly and is easy to use.

Once a voter has cast their ballot the machine is disabled until another valid voter code is entered. The voter's ballot image is stored in random locations on the EVU, and the JBC's flash memory and the EBB. The ballot images cannot be erased from the JBC or the EVU without a utility program that is not available to the precinct workers. The ballot images can be recalled from the EVU or JBC in the event an audit is required.

There are public and private counters on the JBC's but not a protective counter on the EVU as required by the Election Code.

Another problem with the EVS is that the polls can be opened without a "zero totals" report being printed. This should be a requirement.

After the polls are closed, a precinct results report is printed on the JBC printer. The results can also be transferred from the JBC via modem. The results can be transferred to a public and press viewing station in the central-count facility, not the central-count tally PC.

TALLY

The Tally system is used to perform the central-count accumulation and generate reports. It runs on standard PC running the NT operation system. It receives the current election ballot setup from the BOSS subsystem. The precinct results are entered into the system via the EBB (PCMCIA cards). Only valid EBB's will be accepted by Tally and once a card is read into the system it can not be entered again. This was tested during the examination and a log entry is printed indicating the second attempt.

The Tally system accumulated the test results correctly. It has a real-time log but it lacks the necessary detail to perform an audit. For example when each of the precinct results are accumulated the log should indicate the precinct # tallied and the total number of ballots cast. All activity that is performed by Tally and its operator during the tabulation should be logged in detail.

When the log printer goes off-line the Tally is exited. When the operator restarts

Tally the log does not indicate why the program stopped. It would be better to log the problem into buffer that gets printed once the printer is back on-line. The program should be suspended not closed down.

The database used by the Tally system is SQLAnywhere. The database is locked by the Tally system when it is running so another process or user cannot gain access to the data. The database is password protected. A tampered or corrupted database cannot be installed in its place because of the checksum validation.

The operator of Tally is allowed to manually alter the results. This is logged however.

Conclusion

The Worldwide system is a nicely integrated system. It is easy to use and accurately recorded and accumulated the test ballots cast. It is good system with a few significant deficiencies. I recommend certification if the problems noted are corrected.

Tom Watson
Examiner



DEPARTMENT OF INFORMATION RESOURCES

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Ann McGeehan
Deputy Assistant
Secretary of State
1019 Braxos Street
Austin, TX 78701

RE: Certification of Worldwide Election Systems voting system (yet to be named) May 16, 2000

Dear Ms. McGeehan:

I attended a scheduled examination at 9:30 a.m. Tuesday, May 16, 2000 for the purpose of examining a Direct Recording Electronic Device (DRE) voting system produced by Worldwide Election Systems. The report below summarizes my findings from the examination.

□ System description

The as-yet-unnamed system is composed of 3 parts that were examined (see diagram below).

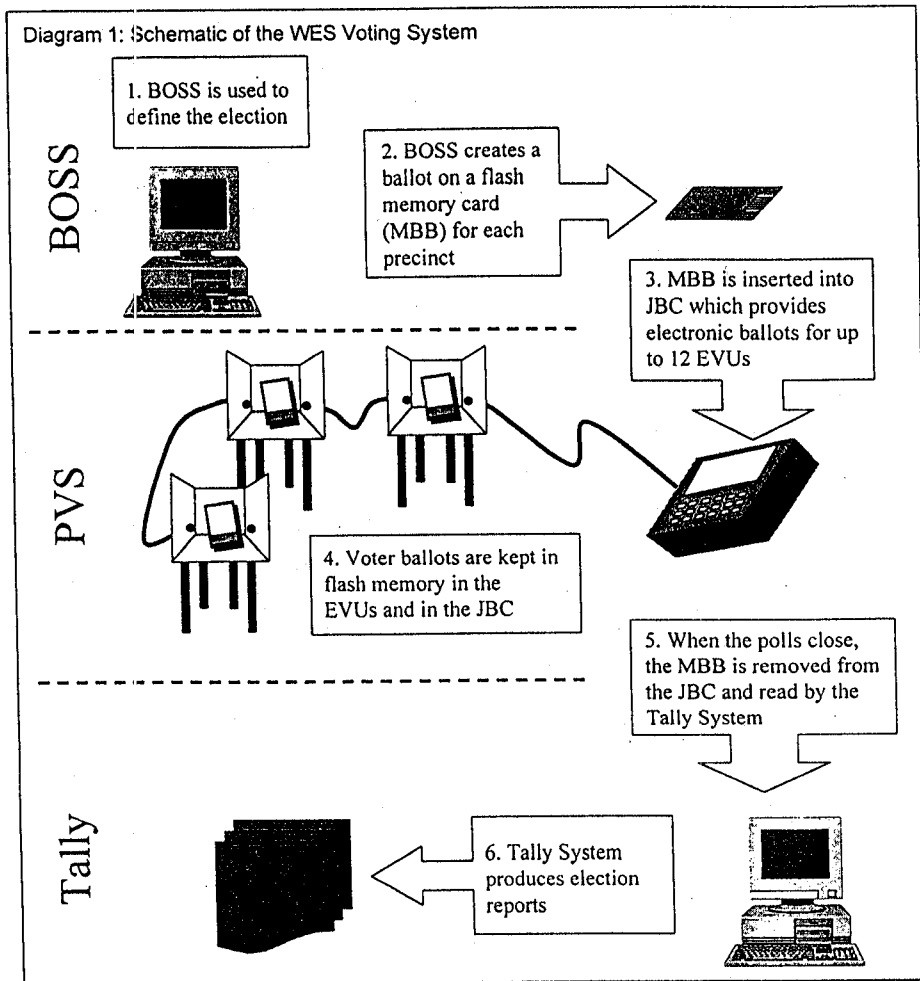
- ♦ The Ballot Origination Software System (BOSS) with jurisdictions, precincts, races, and ballots defined;
- ♦ The Precinct Voting System (PVS) consists of a Judge's Booth Controller (JBC) that is attached and controls the Electronic Voting Units (EVU) in which voters cast their ballots;
- ♦ The Tally System (Tally) which tallies votes collected by the JBCs at precinct polling locations.

The BOSS is used to enter information about precincts, races, candidates and other information specific to an election. This information is recorded in an election database. When the election definition is complete, the database is locked and BOSS creates ballots specific to each polling place within each precinct.

A polling place may have one or more JBCs. Each JBC may control up to twelve EVUs that are connected to it through daisy-chained serial cables. The BOSS creates a separate ballot for each polling place and writes it to a flash memory card, called a Mobile Ballot Box (MBB). The MBB is inserted into a JBC at the polling place, and defines what races and issues the voters can vote on.

When the polls are opened at a polling place, the election officials initialize the JBC, all vote totals in the JBC and EVUs are set to zero, and an initialization report is created. As voters cast their ballots, each ballot is recorded in flash memory in the EVU and sent to the JBC as well. All ballots, including challenges, are recorded on the flash memory card (MBB) in the JBC. Each MBB can store at least 10,000 ballots.

When the polls close, the JBC writes a closing report. The flash memory cards are removed from the JBCs and taken to the election headquarters. They are read by the Tally System that counts votes and creates various reports.



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□ Controls, logs, and security

BOSS is password protected with standard password procedures. The database is also password protected. Once the election has been defined the database cannot be changed. It can be copied, however, so that definitions do not have to be re-entered for new elections.

The flash memory cards that carry the election definition for each precinct and polling place have internal serial numbers so they can be tracked. When the flash memory card is inserted into the JBC, the serial number from the JBC is recorded in the flash memory card. The card cannot be used in any other JBC until it is cleared by special utility software in the election computer and reprogrammed. If a JBC goes down during an election, a new one must be brought to the polling location, and the totals must be reconstructed from the ballots stored in the flash memory on the EVUs.

The JBCs require little power, and are backed up by batteries in case of a power outage. Ballots in the EVUs are protected because they are stored in flash memory. However, any votes that are not cast and written to flash memory would be lost in case of a power outage. This would affect only those voters who are in the process of voting at the time, a maximum of 12 voters per JBC.

Voters register with polling officials at the JBC and receive a four-digit password that allows them to vote only once. The password expires if not used within a specific period. This period can be adjusted as needed by election officials. Tally software tracks passwords that expire without being used, indicating that some voters did not finish casting their votes, or perhaps signaling voting irregularities.

When the Tally System reads a flash memory card, it compares the serial number on the card with the list of cards that were created to ensure that it is valid. The files on the card are in a proprietary format that reduces the likelihood of tampering. There is no way to send vote tallies via modem or other remote connection. All ballots must be counted by processing the memory cards through the Tally System.

□ Evaluation

All three components were designed to be an integrated system. Thus there are no awkward transitions or procedures required between components. All hardware is manufactured in ISO 9000 certified facilities.

The user documentation is thorough and detailed. The manuals for all three components are all on CD in Adobe Acrobat (PDF) format. This allows users to search them online or print them as needed.

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Each manual has procedure checklists for each function that are clear and well illustrated and frequent screen shots to help users navigate the BOSS and Tally System. Numerous graphics help users understand the layout of the Precinct Voting System and how to set it up for an election.

The systems use currently accepted practices to password protect the programs and databases. However, as with all other election systems reviewed to this point, there are no checksums or other security procedure for the databases and programs that would indicate whether they have been compromised by some program outside the control of BCSS.

The Tally System did not write to the log printer when write-in candidates were added. In addition, a printer error caused the Tally System to shut down. During the examination these issues were brought to the attention of the WES personnel.

□ Recommendation

Aside from the log printer issues, the systems appear to meet the requirements for certification as set by the Texas Secretary of State. It is recommended that all three components be certified when the issues with the log printer are resolved.

Respectfully submitted,



Nick Osborn
Systems Analyst

CP:MM:NO:sk

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May 23, 2000

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Re: Worldwide Election Systems ("Worldwide")

Dear Ms. McGeehan:

Pursuant to my appointment as an examiner under §122.035 of the Texas Election Code, I attended a scheduled examination on Tuesday, May 16, 2000, for the purpose of examining the above referenced Worldwide Election Systems Voting System ("WWVS"). The major components of the WWVS consisted of the Ballot Origination Software System ("BOSS"), the Precinct Voting System and the Tally System. At that time, Worldwide made a presentation and the examiners were able to ask questions and examine the use and function of WWVS.

In that examination, I relied upon representations of Worldwide concerning operation of the software and electronic components. Those representations were made during an extended examination and were considered together with those contained in the BOSS Operations Manual, the Tally System Operations Manual and the Precinct Voting System Election Day Manual and miscellaneous materials for WWVS as distributed by Worldwide. Other than examining the materials provided, observing the demonstration, presenting questions and observing the response of Worldwide to my questions and those presented by the other examiners, I did not conduct an independent examination of the software or the electronic components. The software version number of each of the separate components of the WWVS was stated by Worldwide to be Version 1.04.03, and that version is the subject of this report.

This report is concerned solely with the ability of the WWVS, and the separate components, to operate and comply with Texas Election Law and procedure. No opinion is expressed regarding the suitability of the either system for the purposes of or use by any jurisdiction. The WWVS, as a whole, is a voting system and an electronic voting system as those terms are defined in § 121.003, *Tex. Elec. Code*.

Precinct Election System.

The Precinct Election System [Version 1.04.03] consists of a Judges Booth Controller 1000 (the "JBC"), Electronic Voting Units ("EVU"), and a Mobile Ballot Box ("MBB") that is installed

in the JBC, with attendant subparts. A modem election reporting feature is also included with the JBC at the precinct level, however it is not intended for reporting official results.

Judges Booth Controller. The JBC is a potentially stand alone computer with a custom circuit board designed for the sole purpose of providing for precinct level voting. The JBC has no hard drive and all data is stored on a flash drive. The JBC has a thermal printer that is used to print tapes showing the polls were cleared and the election precinct report at the close of voting. The printer also is used to print random numbers that are given to voters to use to enable an EVU for voting. Up to twelve (12) EVUs can be attached to one JBC. The JBC is included within the definition of voting system, electronic voting system, voting system equipment, and automatic tabulating equipment, as defined in § 121.003, *Tex. Elec. Code*.

The morning of the election, the JBC is set-up and connected to the EVUs, the JBC and EVUs are then connected to a power source and the election judge confirms the pre-recorded precinct location on the JBC (or changes the location if incorrect), assigns station numbers to the EVUs, and enters a required, preassigned password to enable the election. The JBC will print a zero vote totals. However, if the JBC memory is not clear the JBC will not clear the memory and provide the zero totals report. If prior ballots are on the JBC a utility program must be run to clear the JBC. It should be specifically noted, however, that an election judge can open the polls without running a zero totals report. Further, although the JBC reportedly contains internal electronic log records of all steps and actions from election set-up at the precinct to the close of polls, no real time, paper log printer is provided.

The JBC appeared to function with the EVUs in a manner sufficient to record, tabulate and report the votes cast. However, the polls can be opened and an election conducted with the JBC without first establishing votes are not pre-recorded on the JBC, i.e. without printing a zero vote report. In addition, the JBC is clearly within the definition of "automatic tabulating equipment" and does not include a real time log printer.

Election Voting Units. The EVUs are connected serially to the JBC. Each EVU has a permanent serial number, and is assigned a separate booth number by the election judge. If one EVU is down the EVUs connected down line from that EVU will not function. When the voter casts a vote on the EVU, the vote is automatically transported to the JBC. When the vote is received at the JBC a small light appears briefly to indicate a vote is cast. If power is lost, the design is stated to give time to store all ballots on the EVU and JBC that have been cast. Cast ballots are reported to be immediately stored in the EVU, and reported to the JBC where it is stored in flash memory and on a flash card. The EVU is reported to be able to retain up to 5,000 large ballot images, and the JBC up to 10,000 large ballot images. The EVU is voting system equipment as defined in § 121.003, *Tex. Elec. Code*. The EVU is used as a voting machine, and reportedly has all the images of the ballots cast on the EVU stored on the EVU. However the EVU does not constitute a voting machine, as defined in § 121.003, because it is not designed to "furnish a total of the number of votes cast for the candidates and for and against

the measures." The EVU does not have a "protective counter" or a "registering counter" as §122.033 requires for voting machines. As a result, the Secretary may wish to consider addressing this issue by administrative rule.

Mobile Ballot Box. The MBB is a flash card that is used to set up the JBC for precinct level voting, initialize the election, store and report the votes and ballot images, and be taken to election central for precinct reporting. Worldwide maintains that the official election results are the MBB cards and the information thereon. The MBB is included within the definition of voting system equipment as defined in § 121.003, *Tex. Elec. Code*. The MBB appeared to function adequately and in compliance with the requirements of the Texas Election Code.

Recommendation. I recommend Worldwide's Precinct Election System not be certified by the Secretary at this time. The EVUs and the JBC essentially function as one system, i.e. both, acting as a system, are required to conduct voting at the precinct level. It should not be possible to begin voting without producing a zero tape report. While this correction may, or may not, be readily made without other material changes, it appears the JBC and EVUs are not presently designed to function with a real time log printer. The absence of an audit log compliant with the requirements of *Tex. Adm. Code, Title 1, Part 4, Chapt. 81, Subchapt. D, Rule § 81.62*, appears to preclude certification. And, absent the audit log, it appears the Election Precinct System cannot meet the requirements of § 122.001, *Tex. Elec. Code*. In this examiners opinion, the satisfaction of these requirements and verification on re-examination is particularly important, given the need to modify the JBC so that voting may not be started without first printing a zero vote report; the absence of "protective counters" and "registering counters" on the EVUs; and the potential for a disruption between one of the downstream EVUs and the JBC.

The modem transfer of vote totals from the JBC appeared to function accurately. However, this part of the Election Precinct System was represented as not being intended for use as a report to election central and the "Tally System". Rather, the modem transfer function is intended only for reporting unofficial results to the media. Therefore, if and when Worldwide's Election Precinct System is certified, I further recommend that: (1) the certification providing that the modem not be connected to the JBC until after the close of polls; (2) the log printer record the connection of the modem to the JBC; and (3) the modem not be certified for the transfer of election precinct results to the "Tally System".

Tally System

The "Tally System" essentially consists of a personal computer operating on Windows NT Platform software, reading MBBs and tabulating votes from the MBBs, and providing election

results. The real time audit log is functional and must be operational for the Worldwide Tally System to function. For example, when the audit long printer was turned off the Tally System exited the operating program. However, the real time audit log was not demonstrated as logging many of the more important events and clearly did not log every single material event. As examples, the audit log printer did not log the following events: (1) going into the election program to add a list of write-in candidates for whom votes would be counted; (2) inserting MBB into the election central computer; (3) the operator exiting the Tally System program to other operating programs; or (4) that log printer was turned off during Tally System operation.

It was also possible for the operator to enter into other operating programs while the Tally System was operating. This raises a material security issue and was not logged. In this respect, the Tally System also allows the operator, without the audit log noting the event, to take such actions as, during operation of the tabulation process, adding names for which write-in votes will be recorded, and to add additional name spellings that will be read and credited to candidates. The Tally System does not meet the requirements of *Tex. Adm. Code, Title 1, Part 4, Chapt. 81, Subchapt. D, Rule § 81.62*. And, absent material improvements to the audit log and modification to limit the use and operation of other operating programs during the vote count, it appears the Tally System does not meet the requirements of § 122.001, *Tex. Elec. Code*.

The Tally System appears to efficiently and correctly tabulate votes and provide election results. However, despite the time expended reviewing the Tally System, I was unable to satisfactorily resolve questions regarding the safety, security and auditability of the Tally System.

Recommendation. I recommend the Tally System not be certified by the Secretary at this time. It was not demonstrated to satisfy the audit record requirements of § 122.001(11) and Rule §81.62, and was not shown to satisfy the security requirements of § 122.001(4), *Tex. Elec. Code*. The real-time audit log function falls far short of satisfying the Code requirements. Given the apparent significant modifications to provide a compliant audit log, and the importance of at least logging events such as adding write-in vote candidates, etc., and entering into other operating programs, during tabulation, re-examination is recommended.

Ballot Origination Software System

Given the unexpected and extended period of time required for the examination of the Election Precinct System and the Tally System, I was unable to participate in the examination of BOSS. I attended almost 3 1/2 hours of the presentation prior to leaving for a mandatory appearance. For this, I extend my apology to both Worldwide and the Secretary.

Very truly yours,


Barney L. Knight



STATE OF TEXAS

REPORT OF EXAMINATION OF MODIFICATIONS TO HART INTERCIVIC'S eSLATE VOTING SYSTEM

PRELIMINARY STATEMENT

On May 30, 2001, Hart InterCivic (the "Vendor") presented modifications to its eSlate voting system for examination and certification. The examination was conducted in Austin, Texas. Pursuant to Sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

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4. Mr. Glenn Glover, an expert in electronic data communication systems.

Pursuant to Section 122.035(a), the Texas Attorney General appointed Dr. Jim Snceringer, an expert in electronic data communication systems.

After the Vendor presented its system, the examiners examined it and cast ballots. Examiner reports on the system are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF MODIFICATIONS TO eSLATE VOTING SYSTEM

The eSLATE voting system is a DRE ("Direct Recording Electronic") for elections consisting of three subsystems: the Ballot Origination Software System ("BOSS"), the Precinct Voting System ("PVS"), and the Tally System ("TS").

BOSS was modified to increase the amount of text that could be added to the body of the ballot, allow the insertion of new columns in the ballot, improve audio recording for disabled voters, and add support for Ballot Now. Version 2.5 was presented for examination.

PVS was modified to add a summary screen for voters to review their selections, add a warning for a blank ballot, improve navigational aids to assist voters in paging through the ballot, and modify the election judge's early voting report format. PVS v. 1.13 was presented for examination.

The TS was modified to provide an improved report format and add support for Ballot Now. Version 2.6 was presented for examination.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of our voting system examiners as set out in their written reports.

The modifications to the eSlate voting system meet the standards for certification as prescribed by Section 122.001 of the Texas Election Code. Specifically, the modifications, subject to the condition below:

1. Preserve the secrecy of the ballot;
2. Are suitable for the purpose for which it is intended;
3. Operate safely, efficiently, and accurately;
4. Are safe from fraudulent or unauthorized manipulation;
5. Permit voting on all offices and measures to be voted on at the election;

6. Prevent counting votes on offices and measures on which the voter is not entitled to vote;
7. Prevent counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevent counting votes for more than the number of candidates for whom the voter is entitled to vote;
8. Prevent counting a vote on the same office or measure more than once;
9. Permit write-in voting;
10. Are capable of permitting straight-party voting; and
11. Are capable of providing records from which the operation of the system may be audited.

CONDITION


This certification expires December 31, 2001, unless the vendor submits to the Secretary of State a report from an independent testing laboratory demonstrating compliance with the Voluntary Voting System Testing Standards issued by the Federal Election Commission.

CONCLUSION

The examiners recommended certification for the modifications to BOSS and PVS, but expressed concern with the security of the Tally system. In response to the issues raised in the examiners' reports, the Vendor modified its Tally system to prevent the user from exiting to Windows NT while Tally is in operation and gaining access to the files underlying the system. The changes were reviewed on July 10, 2001 and found to address the panel's concerns. Accordingly, I hereby certify BOSS v. 2.5, PVS v. 1.13, and TS v. 2.6 for use in elections in Texas.

Certified under my hand and seal of office, this 13th day of July, 2001.




HENRY CUELLAR, Ph.D.
SECRETARY OF STATE



DEPARTMENT OF INFORMATION RESOURCES

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CAROLYN PURCELL
Chief Information Officer
State of Texas

June 27, 2001

◆
BOARD OF
DIRECTORS

Ms. Ann McGeehan
Deputy Assistant
Secretary of State
P.O. Box 12060
Austin, TX 78711-2060

HARRY RICHARDSON,
CHAIR

RE: Review of Hart InterCivic Electronic Voting System, May 30, 2001

JENNIFER
ANDERSON, Ed.D.

Dear Ms. McGeehan:

WALTER "TREY"
BRADLEY III

I attended a review of the Hart InterCivic electronic voting system at 1:30 p.m. on Wednesday, May 30, 2001. The purpose of the review was to examine revisions of the hardware and software of their existing voting systems. The modules were reviewed August 21, 2000 and May 21, 2000. A new component, Ballot Now, was also reviewed at this examination.

DON GILBERT
Ex Officio

The report below summarizes my findings.

MARIO J.
GONZALEZ, Ph.D.

CAROLE S.
GREISDORF

- B.O.S.S. 2.5

Boss is the election definition and ballot creation software. Changes to this subsystem include various enhancements for ballot design. None of the changes appear to affect voting systems behavior over which the examinations have any jurisdiction.

- Tally 2.6

Some new report formats are offered with this revision. In addition, the product has been enhanced to handle overvotes and other anomalies that may occur when tallying paper ballots with the Ballot Now product. The software appears to tally votes correctly and handle errors on paper ballots in accordance with Texas statute and law.

The most serious shortcoming is that a user of the software can exit to the operating system (Windows NT) while Tally is still running. This may allow access to open files and processes by unauthorized users. Preventing this is a relatively simple process and should be addressed before the software is certified for use in Texas.

- Precinct Voting System 2.6

Firmware in the individual voting devices has been tweaked slightly. The major enhancement is a summary screen with which a voter can review all selections

ROLF R. HABERECHE

CHARLES HEALD, P.E.
Ex Officio

LEONARD RILEY, JR.
Ex Officio

June 27, 2001

Page 2

Ms. Ann McGeehan

without having to scroll through the entire ballot. There appear to be no critical errors or malfunctions of the hardware or software.

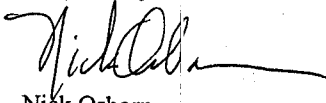
- Ballot Now 1.3

The Ballot Now product allows a jurisdiction to create paper ballots on demand. The ballots can also be counted by scanning them with common, off-the-shelf scanners. It is anticipated that this system will be utilized in early voting in which paper ballots must be sent to voters such as members of the armed forces, or in small jurisdictions that need a simple automated solution to counting or recounting ballots.

Each ballot can be individually coded with a serial number. This is done to prevent fraud such as duplicating ballots. It is also anticipated that serial numbers will be used to identify precincts from which the ballots came, or for other control purposes. However, a serial number can be easily abused, particularly if it assigned according to a predictable sequence. It is suggested that further revisions to the software include generation of a random or pseudo-random serial number to reduce the opportunities for fraud or abuse of the ballots.

At this time DIR cannot recommend certification of the system because of the flaw in the Tally program.

Respectfully,



Nick Osborn
Systems Analyst
Texas Department of Information Resources

CP:EE:MM:NC:sk

The State of Texas

Information Technology Division
P.O. Box 12887
Austin, Texas 78711-2887



Henry Cuellar, Ph.D.
Secretary of State

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TO: Ann McGeehan
Elections Division Director

FROM: Glenn Glover
Voting System Examiner

DATE: 07/10/2001

A voting systems certification examination was held at the Office of the Secretary of State Elections Division on Wednesday afternoon, May 30 2001.

Hart Intercivic submitted the following election products for certification: Ballot Origination Software System (BOSS) version 2.5, TALLY ver 2.6.06, eSlate Precinct Voting System and Ballot Now.

Hart Intercivic's May 30th presentation successfully demonstrated their election systems compliance with Texas elections standards except for one security lapse which gave the user the ability to access the files and registry of the NT operating system that supports the TALLY product. The scenario for a security problem was as follows: an unscrupulous and exceptionally computer savvy user could have conceivably manipulated the underlying TALLY system files and registry information in a manner that would violate the security requirement set forth in the Texas Voting System Standards.

However, in a follow up visit by Hart Intercivic on Tuesday morning July 10 2001, Hart demonstrated that this security lapse was corrected and included into their Tally product. The revised Tally system eliminated access to the NT taskbar's Tasklist where a user could shell out to a command prompt or Windows Explorer allowing access to the file structure of the Tally and NT system. This ensures the integrity and security of the underlying Tally system and eliminated the one issue of the Voting examination that would have prevented certification of the Hart system.

As a result of Hart's subsequent visit and correction of the security lapse noted above, I find that their voting system is in full compliance with Texas Voting System Standards as found in Chapter 122 of the Texas Election Code. I recommend that the BOSS ver 2.5, TALLY ver 2.6.06, eSlate Precinct Voting System and Ballot Now be certified for use in the State of Texas.

All comments and recommendations made in my capacity as an examiner of voting systems are based on documentation and demonstrations provided by Hart Intercivic.

**Barney L. Knight
& Associates
Attorneys at Law**

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J. Greg Hudson
Of Counsel

June 20, 2001

Ann McGeehan
Deputy Assistant
Secretary of State
P.O. Box 12060
Austin, Texas 78711-2060

Re: Hart Intercivic, Inc. ("Hart") Voting System

Dear Ms. McGeehan:

Pursuant to my appointment as an examiner under §122.035 of the Texas Election Code, I attended a scheduled examination on Wednesday, May 30, 2001, for the purpose of examining the above referenced Hart Voting System ("Hart VS"). The major components of the Hart VS consisted of the Ballot Origination Software System ("BOSS"), the eSlate Precinct Voting System ("eSlate"), the Tally System ("Talley") and the Ballot Now product ("Ballot Now"). At that time, Hart made a presentation and the examiners were able to ask questions and examine the use and function of Hart VS.

In that examination, I relied upon representations of Hart concerning operation of the software and electronic components. Those representations were made during an extended examination and were considered together with those contained in the BOSS Operations Manual, the Tally Operations Manual, and the eSlate and Ballot Now manuals and miscellaneous materials for Hart VS as distributed by Hart. Other than examining the materials provided, observing the demonstration, presenting questions and observing the response of Hart to my questions and those presented by the other examiners, I did not conduct an independent examination of the software or the electronic components. The software version number of each of the separate components of the Hart VS was stated by Hart to be as follows: BOSS Version 2.5, Tally Version 2.6, eSlate Version 1.13 and Ballot Now Version 1.3.

This report is concerned solely with the ability of the Hart VS, and the separate components, to operate and comply with Texas Election Law and procedure. No opinion is expressed regarding the suitability of the either system for the purposes of or use by any jurisdiction. The Hart VS, as a whole, is a voting system and an electronic voting system as those terms are defined in § 121.003, *Tex. Elec. Code*.

eSlate Precinct Voting System.

The eSlate Precinct Voting System [Version 1.13] has been modified to provide several user friendly enhancements to the version previously certified by the Secretary. These consisted primarily of a summary screen, features applicable to undervotes, a warning screen before a voter casts a totally blank ballot, beneficial navigational aides and a report format for the Judges Booth Controller. eSlate is configured and functions in substantively the same manner as previously certified and the modifications and improvements were primarily to software. eSlate, V. 1.13, improves the previously certified version and is therefore appropriate for certification.

Ballot Now

The same "Boss" card used with the Mobile Ballot Box for early voting can be used for Ballot Now. Ballot Now, Version 1.3, allows ballots to be printed on a standard laser printer. When such ballot is returned by the voter, it is imaged into Ballot Now. The ballots have codes that are printed on them to identify the appropriate precinct, election, etc. This on demand system allows ballots to be printed in the office and can add up to fourteen (14) days to the time actually available for early voting. The use of bar codes on the ballots allows the voting system to track whether or not a ballot has been scanned/tabulated previously. Ballot Now, V. 1.3, prepares and images ballots and is used with previously certified voting systems. It appears to meet the requirements of the Texas Election Code, and I recommend certification.

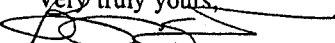
Tally System

The Tally System, Version 2.6, is an upgrade of the Tally System previously certified by the Secretary. Version 2.6 provides an improved report format and support for the new Ballot Now product, in addition to other minor modifications. Tally Version 2.6 enhances the version previously certified by the Secretary and, as a result, may be determined appropriate for certification. However, it is noted that the operator continues to have the ability to enter into the operating system while Tally is operating. This raises a security and audit issue.

Ballot Origination Software System

BOSS, Version 2.5, added or improved the ability to add text to the body of the ballot, to insert new columns in the ballot, and to provide ballot rotation. Version 2.5 also improved the audio interface for improvement of recordings, and added support for Ballot Now. Version 2.5 appears to enhance the previously certified version and to satisfy the requirements of the Texas Election Code, and is appropriate for certification.

Very truly yours,


Barney L. Knight

HART Intercivic

Worldwide Elections Systems demonstrated their voting system in Austin on May 30, 2001. There were changes to the previous examined BOSS, Tally, and PVS (Precinct Voting System) systems. A new product, BallotNow was also examined.

The changes to 3 certified systems are as follows:

BOSS (version 2.5)

- 1) added capability to add text to the body of a ballot
- 2) added capability to force a new page or column on a ballot
- 3) add ballot rotation (not used in Texas)
- 4) improved audio recording for ADA voting
- 5) added support for the BallotNow product.

TALLY (version 2.6)

- 1) improved report formats
- 2) added support for BallotNow

PVS (version 1.13)

- 1) added summary screen for the voter to review his selections
- 2) added a warning for a blank ballot
- 3) added navigation aids
- 4) modified election judge's early voting report format

The changes to these subsystems are largely cosmetic and they did not impact the ability of each system to perform accurately. I see no reason to revoke certification.

BallotNow

The BallotNow system is a unique offering from Hart. It allows a jurisdiction to generate paper ballots to be used for mail-in voting and then be counted by the Tally central accumulation system. It runs on a PC and requires a laser printer and Hart certified flat-bed scanner for reading the voted ballots.

Printing can be done by the election administration on laser printer as needed once the ballot has been certified. This provides low cost printing and printing closer to the voting period than is possible by an outside printer.

Each ballot is printed with a unique barcoded serial number that prevents a ballot from being read twice. The ballots are printed with registration marks which enables the BallotNow image reading software to accurately detect a voter's selections regardless of skewing of the ballot on the paper.

A ballot is scanned into BallotNow and if a overvote or undervote is found the review board can look at an exact image of the ballot on screen, with all the voter's markings, to determine the voter's intent and resolve the ballot accordingly.

Ballots that are accepted into BallotNow are then converted to same ballot format used by the precinct voting system (PVS) so they can be read by the Tally accumulation and reporting system.

The BallotNow system was able to accurately record the examiner's ballots.

Conclusion

I recommend certification for the BallotNow system.

There is still an issue with the Tally system. A election worker is able to escape the operation system while accumulation is occurring without his actions being recorded on the real-time log. This should be prevented.

Tom Watson
Examiner

5014 Lakeview Dr
Austin, TX 78732

June 3, 2001

Phone: 512-266-2770

Fax: 512-266-2771

E-mail: Jim@Sneeringer.com

Honorable Henry Cuellar
Secretary of State
Attention: Elections Division
P.O. Box 12060
Austin, Texas 78711

Dear Secretary Cuellar:

Enclosed are my reports on the election-systems examinations which took place on May 29 and 30.

Please contact me if I can be of further assistance.

Sincerely,

W. James Sneeringer

James Sneeringer, Ph.D.
Software Consultant

Voting System Examination Hart Intercivic

Prepared for the
Secretary of State of Texas

James Sneeringer, Ph.D.
Designee of the Attorney General
June 2, 2001

This report comprises the findings of the Attorney General's designee from an examination of the equipment listed on May 30, 2001, pursuant to Title 9, Chapter 122 of the Texas Election Code, section 122.036(b).

All Components: Questions, Risks and Problems

1. Since no independent test report has yet been submitted for any of these components, and since they may be modified to fix problems found during the examination and by the independent testing authority, the version presented at the examination may be different from the version approved by the independent testing authority. *If these modifications should be unsatisfactory or have unintended consequences, the examiners will have no opportunity to detect this.*
2. The Form 100 submitted by Hart incorrectly shows that the system was previously certified on September 13, 2000. My records show that they withdrew their request for the examination scheduled for that date. It must have been certified earlier.

Notes

- Hart is ISO 9000 certified, so their design process is certified by an external agency.

DRE System: Precinct Voting System (PVS), Version 1.13 (E-Slate and booth controller)

Election Setup	PCMCIA card (Mobile Ballot Box, or MBB) created with BOSS election setup software
Zero-total report	On thermal printer
Authorization to vote / Ballot selection	A four-digit authorization code is issued to each voter on a tape printed at the election judge's controller
View / Vote	LCD display / selection wheel and keys
Vote Storage	Flash memory (MBB)

Precinct Consolidation	Not applicable. Precinct results are all accumulated together in the judge's controller.
Transfer Results	Flash memory (MBB) used to send to Tally software. Protected by a CRC on each vote record.
Print precinct results	On thermal printer
Straight party / crossover	Yes. A warning is given if a straight party votes cancels a crossover votes that has already been selected. This prevents straight-party voting from having an effect the voter did not intend.

New Features in 1.1.3

- Summary screen to review ballot, partly to address concerns about undervotes
- Warning screen if you try to cast a totally-blank ballot
- Navigational aids (e.g. if you press cast ballot twice, it will signal the poll worker back at the judge's booth that the voter needs help)
- Provides a new optional report so the early-voting judge can get a total of ballots cast when the polls are suspended at the end of the day

Tabulation Software: Tally Version 2.6

Results Storage	Sybase SQL Anywhere
OS access	Not permitted during tally. You can restart the system, but it is logged.
Real-Time Audit Log	Yes. Meets Texas requirement.
Data Integrity	Sybase SQL Anywhere implements transaction protection (using a log file), so that either all the data in a transaction is posted, or none of it is.

Tally: Questions, Risks and Problems

3. Tally can operate on a local area network. Networking allows multiple people to work simultaneously and can provide the redundancy that is required in election systems. However, it also creates a security risk by potentially allowing anyone on the network access to the election data. In short, physical security of the entire network is the only satisfactory answer. *Certification should carry the condition that physical security must be provided for all the computers on the election system network and for all connection points to that network, even if no computer is connected. The use of the computers on the election network for any other purpose should be forbidden when election data is present.*

Ballot Printing Software: Ballot Now Version 1.3

Election Setup	PCMCIA card (MBB) created with BOSS election setup software
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Notes	<ul style="list-style-type: none">• Ballots produced on demand• Each ballot has a serial number and a bar code, which prevents ballots from being counted twice by the Tally software.• Especially good for absentee ballots
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New Features in 1.3

- Improved the report formats
- Support for Ballot Now

Ballot Now: Questions, Risks and Problems

- None



STATE OF TEXAS

REPORT OF EXAMINATION OF HART INTERCIVIC'S BALLOT NOW BALLOT PRINTING SYSTEM

PRELIMINARY STATEMENT

On May 30, 2001, Hart InterCivic (the "Vendor") presented its Ballot Now ballot printing system for examination and certification. The examination was conducted in Austin, Texas. Pursuant to Sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

1. Mr. Nick Osborn, an expert in electronic data communication systems;
2. Mr. Tom Watson, an expert in electronic data communication systems;
3. Mr. Barney Knight, an expert in election law and procedure; and
4. Mr. Glenn Glover, an expert in electronic data communication systems.

Pursuant to Section 122.035(a), the Texas Attorney General appointed Dr. Jim Sneeringer, an expert in electronic data communication systems.

After the Vendor presented its system, the examiners examined it and cast ballots. Examiner reports on the system are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF BALLOT NOW SYSTEM

Ballot Now is software designed to generate paper ballots for early voting by mail that may then be counted by the Tally central accumulation system. It runs on a PC and requires a laser printer and a Hart-certified flat bed scanner for reading the voted ballots. The ballots are printed with registration marks which enables the Ballot Now image-reading software to accurately detect a voter's selections regardless of the skewing of the ballot on the paper. A ballot is scanned into Ballot Now and if a overvote or undervote is found, the review board can look at an exact image of the ballot on screen, with all the voter's markings, to determine the voter's intent and resolve the ballot accordingly. Ballots that are accepted into Ballot Now are converted to the same ballot format used by the precinct voting system (PVS) so they can be read by the Vendor's Tally accumulation and reporting system. Version 1.3 was presented at examination.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of our voting system examiners as set out in their written reports.

The Ballot Now system meets the standards for certification as prescribed by Section 122.001 of the Texas Election Code. Specifically, the system:

1. Preserves the secrecy of the ballot;
2. Is suitable for the purpose for which it is intended;
3. Operates safely, efficiently, and accurately;
4. Is safe from fraudulent or unauthorized manipulation;
5. Permits voting on all offices and measures to be voted on at the election;
6. Prevents counting votes on offices and measures on which the voter is not entitled to vote;

7. Prevents counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevent counting votes for more than the number of candidates for whom the voter is entitled to vote;
8. Prevents counting a vote on the same office or measure more than once;
9. Permits write-in voting;
10. Is capable of permitting straight-party voting; and
11. Is capable of providing records from which the operation of the system may be audited.

CONCLUSION

The examiners recommended certification. Accordingly, I hereby certify the Ballot Now voting system, version 1.3, for use in elections in Texas.

Certified under my hand and seal of office, this 14 day of Dec, 2001.



GEOFFREY S. CONNOR
ASSISTANT SECRETARY OF STATE

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& Associates
Attorneys at Law**

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Attorneys
Sheila I. Jalufka

J. Greg Hudson
Of Counsel

June 20, 2001

Ann McGeehan
Deputy Assistant
Secretary of State
P.O. Box 12060
Austin, Texas 78711-2060

Re: Hart Intercivic, Inc. ("Hart") Voting System

Dear Ms. McGeehan:

Pursuant to my appointment as an examiner under §122.035 of the Texas Election Code, I attended a scheduled examination on Wednesday, May 30, 2001, for the purpose of examining the above referenced Hart Voting System ("Hart VS"). The major components of the Hart VS consisted of the Ballot Origination Software System ("BOSS"), the eSlate Precinct Voting System ("eSlate"), the Tally System ("Talley") and the Ballot Now product ("Ballot Now"). At that time, Hart made a presentation and the examiners were able to ask questions and examine the use and function of Hart VS.

In that examination, I relied upon representations of Hart concerning operation of the software and electronic components. Those representations were made during an extended examination and were considered together with those contained in the BOSS Operations Manual, the Tally Operations Manual, and the eSlate and Ballot Now manuals and miscellaneous materials for Hart VS as distributed by Hart. Other than examining the materials provided, observing the demonstration, presenting questions and observing the response of Hart to my questions and those presented by the other examiners, I did not conduct an independent examination of the software or the electronic components. The software version number of each of the separate components of the Hart VS was stated by Hart to be as follows: BOSS Version 2.5, Tally Version 2.6, eSlate Version 1.13 and Ballot Now Version 1.3.

This report is concerned solely with the ability of the Hart VS, and the separate components, to operate and comply with Texas Election Law and procedure. No opinion is expressed regarding the suitability of the either system for the purposes of or use by any jurisdiction. The Hart VS, as a whole, is a voting system and an electronic voting system as those terms are defined in § 121.003, *Tex. Elec. Code*.

Ann McGeehan
Deputy Assistant Secretary of State
Hart Intercivic, Inc.

2

June 20, 2001

eSlate Precinct Voting System.

The eSlate Precinct Voting System [Version 1.13] has been modified to provide several user friendly enhancements to the version previously certified by the Secretary. These consisted primarily of a summary screen, features applicable to undervotes, a warning screen before a voter casts a totally blank ballot, beneficial navigational aides and a report format for the Judges Booth Controller. eSlate is configured and functions in substantively the same manner as previously certified and the modifications and improvements were primarily to software. eSlate, V. 1.13, improves the previously certified version and is therefore appropriate for certification.

Ballot Now

The same "Boss" card used with the Mobile Ballot Box for early voting can be used for Ballot Now. Ballot Now, Version 1.3, allows ballots to be printed on a standard laser printer. When such ballot is returned by the voter, it is imaged into Ballot Now. The ballots have codes that are printed on them to identify the appropriate precinct, election, etc. This on demand system allows ballots to be printed in the office and can add up to fourteen (14) days to the time actually available for early voting. The use of bar codes on the ballots allows the voting system to track whether or not a ballot has been scanned/tabulated previously. Ballot Now, V. 1.3, prepares and images ballots and is used with previously certified voting systems. It appears to meet the requirements of the Texas Election Code, and I recommend certification.

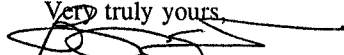
Tally System

The Tally System, Version 2.6, is an upgrade of the Tally System previously certified by the Secretary. Version 2.6 provides an improved report format and support for the new Ballot Now product, in addition to other minor modifications. Tally Version 2.6 enhances the version previously certified by the Secretary and, as a result, may be determined appropriate for certification. However, it is noted that the operator continues to have the ability to enter into the operating system while Tally is operating. This raises a security and audit issue.

Ballot Origination Software System

BOSS, Version 2.5, added or improved the ability to add text to the body of the ballot, to insert new columns in the ballot, and to provide ballot rotation. Version 2.5 also improved the audio interface for improvement of recordings, and added support for Ballot Now. Version 2.5 appears to enhance the previously certified version and to satisfy the requirements of the Texas Election Code, and is appropriate for certification.

Very truly yours,



Barney L. Knight

The State of Texas



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Henry Cuellar, Ph.D.
Secretary of State

TO: Ann McGeehan
Elections Division Director

FROM: Glenn Glover
Voting System Examiner

DATE: 07/10/2001

A voting systems certification examination was held at the Office of the Secretary of State Elections Division on Wednesday afternoon, May 30 2001.

Hart Intercivic submitted the following election products for certification: Ballot Origination Software System (BOSS) version 2.5, TALLY ver 2.6.06, eSlate Precinct Voting System and Ballot Now.

Hart Intercivic's May 30th presentation successfully demonstrated their election systems compliance with Texas elections standards except for one security lapse which gave the user the ability to access the files and registry of the NT operating system that supports the TALLY product. The scenario for a security problem was as follows: an unscrupulous and exceptionally computer savvy user could have conceivably manipulated the underlying TALLY system files and registry information in a manner that would violate the security requirement set forth in the Texas Voting System Standards.

However, in a follow up visit by Hart Intercivic on Tuesday morning July 10 2001, Hart demonstrated that this security lapse was corrected and included into their Tally product. The revised Tally system eliminated access to the NT taskbar's Tasklist where a user could shell out to a command prompt or Windows Explorer allowing access to the file structure of the Tally and NT system. This ensures the integrity and security of the underlying Tally system and eliminated the one issue of the Voting examination that would have prevented certification of the Hart system.

As a result of Hart's subsequent visit and correction of the security lapse noted above, I find that their voting system is in full compliance with Texas Voting System Standards as found in Chapter 122 of the Texas Election Code. I recommend that the BOSS ver 2.5, TALLY ver 2.6.06, eSlate Precinct Voting System and Ballot Now be certified for use in the State of Texas.

All comments and recommendations made in my capacity as an examiner of voting systems are based on documentation and demonstrations provided by Hart Intercivic.



STATE OF TEXAS

REPORT OF REVIEW OF MODIFICATIONS TO HART INTERCIVIC'S eSLATE VOTING SYSTEM

PRELIMINARY STATEMENT

On October 23, 2001, Hart Intercivic (the "Vendor") presented modifications to its eSlate Voting System for examination and certification. The examination was conducted in Austin, Texas. Pursuant to Sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

1. Mr. Nick Osborn, an expert in electronic data communication systems;
2. Mr. Tom Watson, an expert in electronic data communication systems; and
3. Mr. Glenn Glover, an expert in electronic data communication systems.

Pursuant to Section 122.035(a), the Texas Attorney General appointed Dr. Jim Sneeringer, an expert in electronic data communication systems.

The Vendor first demonstrated the systems; the examiners then examined their accuracy and security features. Examiner reports on the systems are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF eSLATE VOTING SYSTEM

The eSLATE voting system is a DRE ("Direct Recording Electronic") for elections consisting of three subsystems: the Ballot Origination Software System ("BOSS"), the Precinct Voting System ("PVS"), and the Tally System ("TS"). The Judges Booth Controller (JBC) is a subset of the PVS.

BOSS version 2.8 was submitted for review.

JBC version 1.15 was submitted for review.

PVS version 1.15 was presented for examination.

The TS version 2.8 was presented for review.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of our voting system examiners as set out in their written reports.

The modifications to the eSlate voting system meet the standards for certification as prescribed by Section 122.001 of the Texas Election Code. Specifically, the modifications:

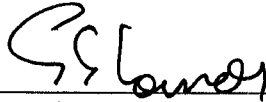
1. Preserve the secrecy of the ballot;
2. Are suitable for the purpose for which it is intended;
3. Operate safely, efficiently, and accurately;
4. Are safe from fraudulent or unauthorized manipulation;
5. Permit voting on all offices and measures to be voted on at the election;

6. Prevent counting votes on offices and measures on which the voter is not entitled to vote;
7. Prevent counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevent counting votes for more than the number of candidates for whom the voter is entitled to vote;
8. Prevent counting a vote on the same office or measure more than once;
9. Permit write-in voting;
10. Are capable of permitting straight-party voting; and
11. Are capable of providing records from which the operation of the system may be audited.

CONCLUSION

The voting systems examiners recommended certification. Accordingly, I hereby certify BOSS v. 2.8, JBC v. 1.15, and TS v. 2.8 for use in elections in Texas.

Certified under my hand and seal of office, this 3rd day of Jan, 2009



GEOFFREY S. CONNOR
ASSISTANT SECRETARY OF STATE

The State of Texas



Information Technology Division
P.O. Box 12887
Austin, Texas 78711-2887

Phone: 512-463-5609
Fax: 512-463-5678
TTY (800) 735-2989
www.sos.state.tx.us

Henry Cuellar, Ph.D.
Secretary of State

TO: Ann McGeehan
Elections Division Director

FROM: Glenn Glover
Voting System Examiner

DATE: December 11, 2001

A voting systems certification examination was held at the Office of the Secretary of State Elections Division on Tuesday morning, Oct. 23, 2001.

Hart Intercivic submitted the following election products for certification: Ballot Origination Software System (BOSS) version 2.8, TALLY ver 2.8, eSlate Precinct Voting System v1.15, Ballot Now v1.4, and M2B3 Multi memory card reader.

The BOSS, TALLY and E-SLATE product lines were previously certified in May of this year. The new versions of these products appear to continue to comply with Texas Election Standards. The software changes enhance the functionality of the system such as providing additional error checking for undervotes.

The two new products: Ballot Now v1.4 and the M2B3 multi memory card reader add additional functionality to Hart's election system product line. No problems were found during the presentation of these new products that would prevent certification.

After reviewing the documentation and attending the examination, I recommend that the BOSS ver 2.8, TALLY ver 2.8, eSlate Precinct Voting System v1.15, Ballot Now v1.4, and the M2B3, be certified for use in the State of Texas.

All comments and recommendations made in my capacity as an examiner of voting systems are based on documentation and demonstrations provided by Hart Intercivic.

HART Intercivic

Hart InterCivic demonstrated their voting system in Austin on October 22, 2001. There were changes to the previous examined BOSS, Tally, and BallotNow and Eslate systems.

The current releases of the systems are as follows:

BOSS - version 2.8
TALLY - version 2.8
BallotNow - version 1.4
Eslate (firmware) - version 1.1.5

A summary of the changes is as follows:

- Modified ballot generation code to improve formatting capabilities, font handling, and text placement.
- Added capability to create and save templates.
- Cosmetic or insignificant changes to BOSS user interface.
- Added the capability to have a multiple flash card reader/writer (M2B3). The M2B3 is used by BOSS to "burn" the mobile ballot boxes (flash cards). The M2B3 is also used by TALLY to queue up multiple mobile ballot boxes from the precincts when the polls are closed. Reading of the ballots is still serial, that is, one flash card is read a time by TALLY.
- Added flashing icons to the Eslate summary screen to help a voter see if there is more screens to the summary and/or how to cast the ballot.
- The security of the TALLY system has been enhanced so that an election worker is no longer able to escape the operation system while accumulation is occurring.

Conclusion

The systems performed flawlessly. I recommend certification of each system.

Tom Watson
Examiner

Voting System Examination

Hart Intercivic

Prepared for the
Secretary of State of Texas

James Sneeringer, Ph.D.
Designee of the Attorney General
November 10, 2001

This report comprises the findings of the Attorney General's designee from an examination of the equipment listed on October 23, 2001, pursuant to Title 9, Chapter 122 of the Texas Election Code, section 122.036(b).

All Components: Questions, Risks and Problems

1. Since no independent test report has yet been provided for these components, and since they may be modified to fix problems found by the independent testing authority, the version presented at the examination may be different from the version approved by the independent testing authority. *If these modifications should be unsatisfactory or have unintended consequences, the examiners will have no opportunity to detect this.*

DRE System: Precinct Voting System (PVS), Version 1.15 (E-Slate and booth controller), Previously Certified

New Features in 1.15

- On the summary screen at the end of the ballot, they added flashing icons to indicate which button to press to move to the next page of the summary or to cast your vote

PVS: Questions, Risks and Problems

- None

Multiple Card Reader, M2B3

- Reads and writes flash memory cards (Mobile Ballot Box, MBB)
- There is still a resident card reader in the PC
- This allows reading of 4 cards simultaneously, and reads them faster
- Used by BOSS and Tally

M2B3: Questions, Risks and Problems

- None

Ballot Printing Software: Ballot Now Version 1.4

New Features in 1.4

- Improved formatting of printed ballots
- New templates can become part of the customer's default database
- Slight user-interface changes
- 128 MB cards are addressable

Ballot Now: Questions, Risks and Problems

- None



DEPARTMENT OF INFORMATION RESOURCES

P.O. Box 13564 ♦ Austin, TX 78711-3564 ♦ www.dir.state.tx.us

November 30, 2001

CAROLYN PURCELL
Chief Information Officer
State of Texas

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Ms. Ann McGeehan
Deputy Assistant
Secretary of State
P.O. Box 12060
Austin, TX 78711-2060

RE: Review of Hart Intercivic

Dear Ms. McGeehan:

I attended an examination of the systems produced by Hart Intercivic on October 23, 2001. The following report below summarizes my findings.

Voting system versions

Hardware/software to be certified	Date previously certified
Ballot Origination Software System (BOSS) v2.8	July 13, 2001
Tally v2.8	July 13, 2001
eSlate Precinct Voting System v1.15	July 13, 2001
Ballot Now v1.4	Not certified
M2B3 – Multi memory card reader	New

Hart Intercivic made minor changes to BOSS to produce more "professional" formatting. It also allows the user to create default templates, a sort of default database for elections. This reduces the amount of time and effort required to set up a new election.

An upgraded PCMCIA reader/writer was added as well. This enables BOSS to read or write up to four election definition cards at a time, reducing the load on the operator considerably. The enhancement required small modifications to the user interface in both BOSS and Tally.

Flashing icons were added to the summary screen at the end of the eSlate ballot to indicate problem areas such as undervotes.

The Ballot Now product has become a mature offering with significantly improved user interface. There are some small procedural issues that might be improved. For

instance, a user can't suspend processing of ballot resolution and go to another task. The entire application must be stopped and the user must log off.

It might also be advisable to have a timeout function to prevent possible tampering with ballot resolution. If the system doesn't see any user activity for a period of time, it should lock out all activity and require the user to log in again.

All of the modifications appeared to function as advertised without observable negative side effects. The minor improvements suggested for Ballot Now have no impact on accuracy and completeness of the system.

The Department of Information Resources (DIR) finds no technical objections to certifying all of the above systems at this time.

Sincerely,



Nick Osborn
Systems Analyst

CP:MM:NO:sk



STATE OF TEXAS

REPORT OF EXAMINATION OF MODIFICATIONS TO HART INTERCIVIC'S BALLOT NOW BALLOT PRINTING SYSTEM

PRELIMINARY STATEMENT

On October 23, 2001, Hart InterCivic (the "Vendor") presented modifications to its Ballot Now ballot printing system for examination and certification. The examination was conducted in Austin, Texas. Pursuant to Sections 122.035(a) and (b) of the Texas Election Code, the Secretary of State appointed the following examiners:

1. Mr. Nick Osborn, an expert in electronic data communication systems;
2. Mr. Tom Watson, an expert in electronic data communication systems; and
3. Mr. Glenn Glover, an expert in electronic data communication systems.

Pursuant to Section 122.035(a), the Texas Attorney General appointed Dr. Jim Sneeringer, an expert in electronic data communication systems.

After the Vendor presented its system, the examiners examined it and cast ballots. Examiner reports on the system are attached hereto and incorporated herein by this reference.

BRIEF DESCRIPTION OF BALLOT NOW SYSTEM

Ballot Now is software designed to generate paper ballots for early voting by mail that may be counted by the Tally central accumulation system. It runs on a PC and requires a laser printer and a Hart-certified flat bed scanner for reading the voted ballots. The system has been modified to allow the user to create templates and to improve the formatting of the printed ballots. Version 1.4 was presented at examination.

FINDINGS

The following are my independent findings, based on oral evidence presented at the examination, written evidence submitted by the Vendor in support of its application for certification, and the findings of our voting system examiners as set out in their written reports.

The modifications to the Ballot Now system meets the standards for certification as prescribed by Section 122.001 of the Texas Election Code. Specifically, the system:

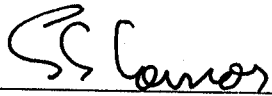
1. Preserves the secrecy of the ballot;
2. Is suitable for the purpose for which it is intended;
3. Operates safely, efficiently, and accurately;
4. Is safe from fraudulent or unauthorized manipulation;
5. Permits voting on all offices and measures to be voted on at the election;
6. Prevents counting votes on offices and measures on which the voter is not entitled to vote;
7. Prevents counting votes by the same voter for more than one candidate for the same office or, in elections in which a voter is entitled to vote for more than one candidate for the same office, prevents counting votes for more than the number of candidates for whom the voter is entitled to vote;
8. Prevents counting a vote on the same office or measure more than once;
9. Permits write-in voting;

10. Is capable of permitting straight-party voting; and
11. Is capable of providing records from which the operation of the system may be audited.

CONCLUSION

The examiners recommended certification. Accordingly, I hereby certify the Ballot Now voting system, version 1.4, for use in elections in Texas.

Certified under my hand and seal of office, this 3rd day of Jun, 2008



GEOFFREY S. CONNOR
ASSISTANT SECRETARY OF STATE